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Title: Novel Molten Salt Neutron Imaging Furnace Design

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Novel Molten Salt Neutron Imaging Furnace Design

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- **Motivation**
- **Project statement**



- **3 major obstacles**
- **Thermal analysis**



- **What was accomplished**
- **Next steps**

Motivation

- Gen IV nuclear reactors
- Evolution of moderators
- UNACCEPTABLE uncertainty $\pm 50\%$
- Accuracy and precision improvement necessary

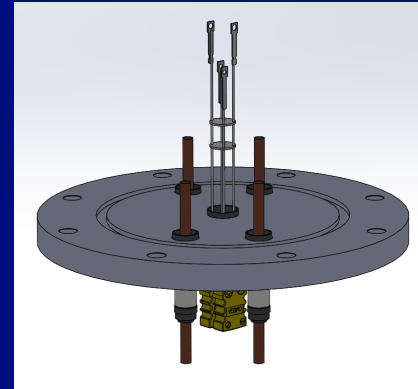
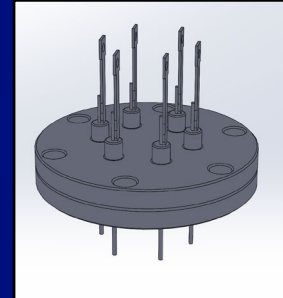
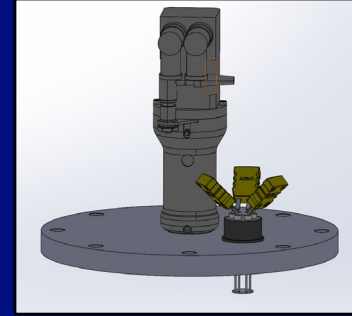
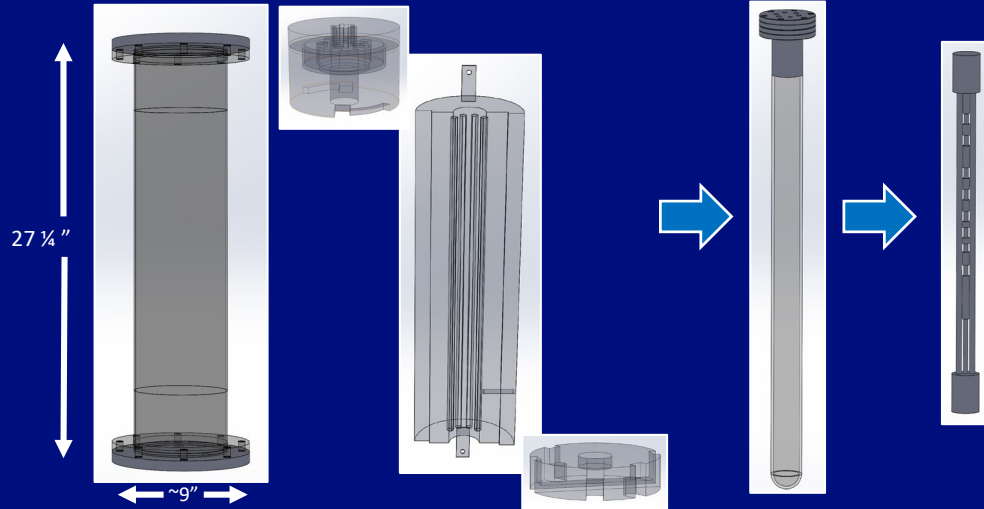




Project Statement

Design a furnace capable of reaching **1200* C**, with **temperature monitoring** and the ability to support the **neutron imaging** of radiological samples while **rotating** the sample containment.

Triple containment

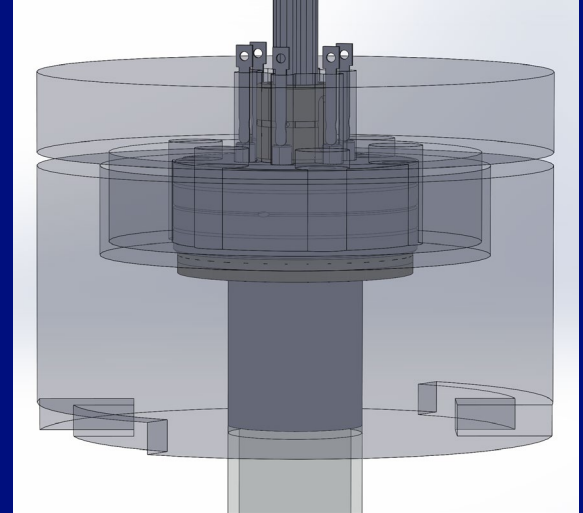
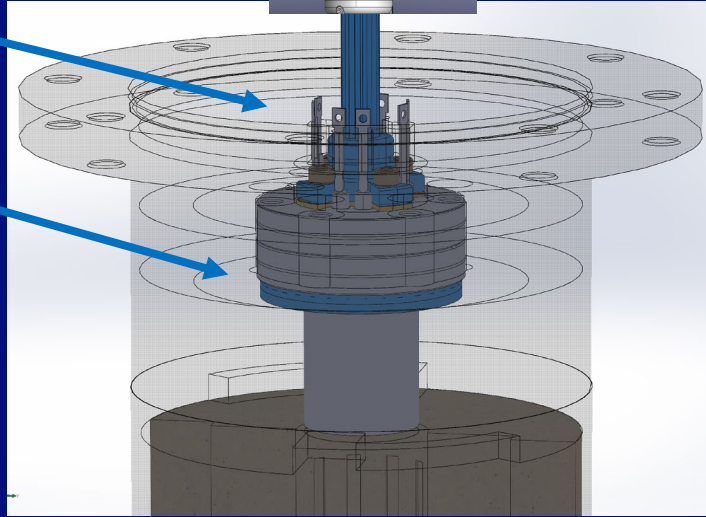
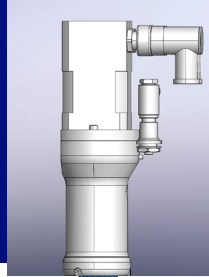


Rotation

Specialized
rotary motor

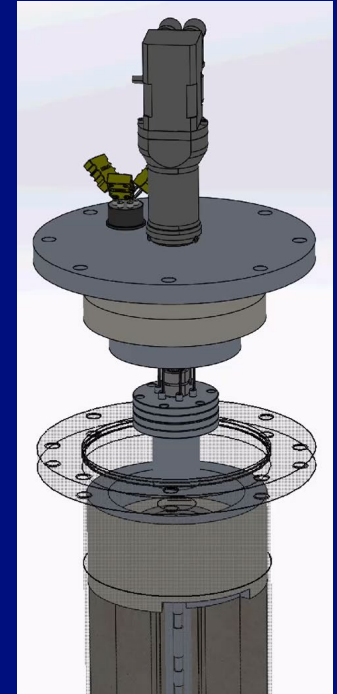
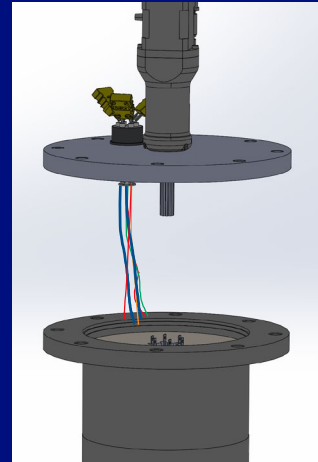
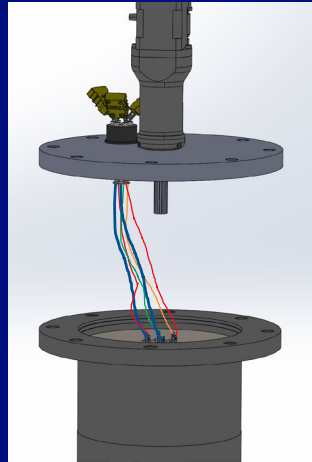
Spline Coupler

Dry-running
thrust bearings



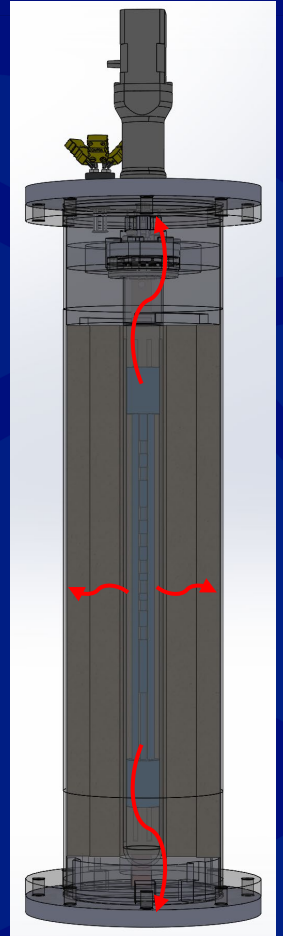
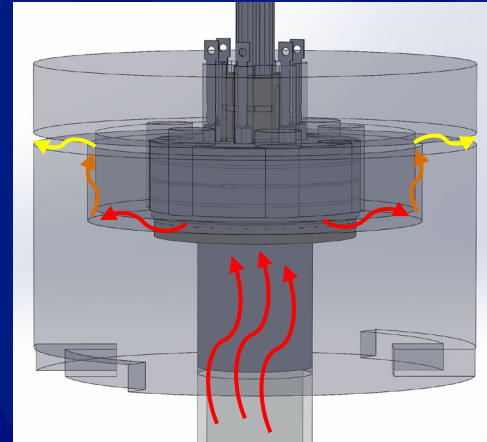
Sample replacement

- Detachable thermocouples
- Breakable coupling connection
- Removable lid+insulation



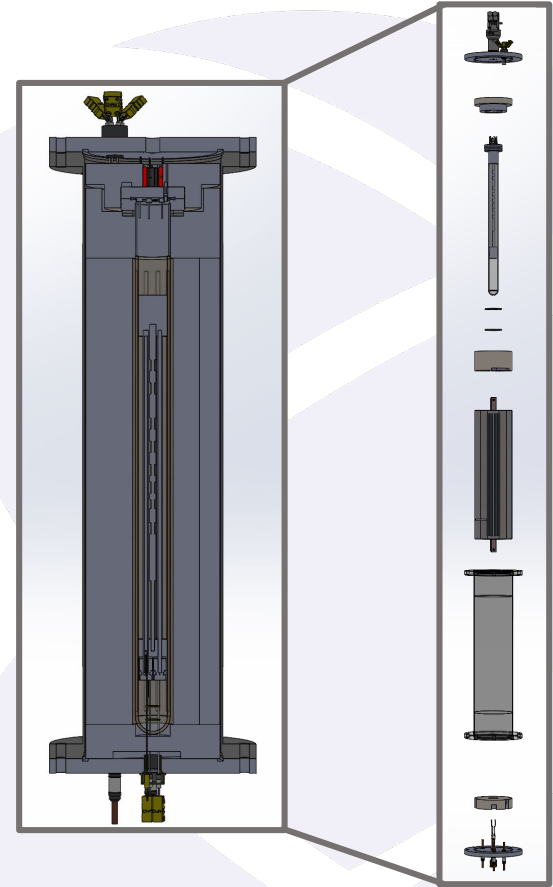
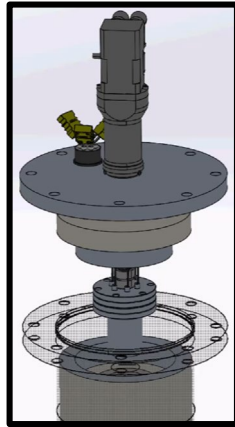
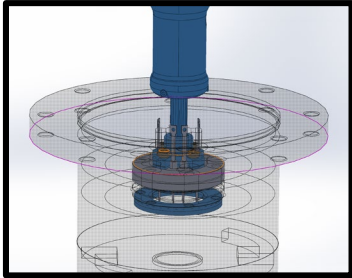
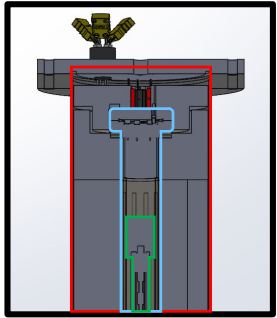
Thermal analysis

- Calculating/comparing heat transfer to max material operating conditions



What was accomplished

- Triple containment
- Rotation
- Sample Replacement



Next steps

- Parts ordered
- Assemble
- Experiment

